

10/20/16

"Life goes by so fast, you only want to do what you think is right. Close your eyes and its past."
-Social Distortion

HW: "Simplifying Rational Expressions" #2-16 even

AIM: Simplifying Rational Expressions

Warm Up:

Take out your MIT and your notes from Monday

1. For what value(s) of x does the expression have no meaning?

(a) $\frac{5}{x}$ (b) $\frac{11}{x-7}$ (c) $\frac{x-2}{x^2-9}$ (d) $\frac{x^2-x-12}{x^2-7x+10}$ (e) $\frac{3}{b^2-2b+1}$

a) $\frac{5}{x}$ $x \neq 0$ b) $\frac{11}{x-7}$ $x-7 \neq 0$
 $x \neq 7$

c) $\frac{x-2}{x^2-9}$ $x^2-9 \neq 0$
 $(x-3)(x+3) \neq 0$
 $x \neq 3 \quad x \neq -3$
 $x \neq \pm 3$

d) $\frac{x^2-x-12}{x^2-7x+10}$ $x^2-7x+10 \neq 0$
 $(x-5)(x-2) \neq 0$
 $x \neq 5 \quad x \neq 2$

e) $\frac{3}{b^2-2b+1}$ $b^2-2b+1 \neq 0$
 $(b-1)(b-1) \neq 0$
 $b \neq 1 \quad b \neq 1$
 $b \neq 1$

2. Find the value(s) of the variable for which each rational expression is not defined.

(a) $\frac{x^2 - 49}{2x^2 - 3x}$

(b) $\frac{4}{c^2 - 16}$

(c) $\frac{x-2}{x^2+4}$

(d) $\frac{6}{3x^3 - 8x^2 + 4x}$

d) $\frac{6}{3x^3 - 8x^2 + 4x}$

$$3x^3 - 8x^2 + 4x \neq 0$$

$$x(3x^2 - 8x + 4) \neq 0$$

$$x(\underline{3x^2 - 6x} - \underline{2x + 4}) \neq 0$$

$$x(\underline{3x(x-2)} - \underline{2(x-2)}) \neq 0$$

$$x(3x-2)(x-2) \neq 0$$

$$x \neq 0$$

$$3x-2 \neq 0$$

$$3x \neq 2$$

$$x \neq \frac{2}{3}$$

$$x \neq 2$$

Simplify each expression.

$$3. \frac{\cancel{15}x^{\cancel{4}}}{\cancel{35}x^2} = \boxed{\frac{3}{7x^2}} \quad \text{rest: } x \neq 0$$

$$\frac{35x^4}{35} \neq \frac{0}{35}$$

$$x^4 \neq 0^4$$

$$x \neq 0$$

⊗ Monomial denominators
 $x \neq 0$

$$5. \frac{2x^2 - 8}{(2x-1)(x-2)} = \frac{2(x^2-4)}{(2x-1)(x-2)} = \frac{2(x+2)\cancel{(x-2)}}{(2x-1)\cancel{(x-2)}} = \frac{2(x+2)}{2x-1}$$

$$= \boxed{\frac{2x+4}{2x-1}} \quad x \neq \frac{1}{2}, 2$$

$2x-1 \neq 0$
 $+1 \quad +1$
 $\frac{2x}{2} \neq \frac{1}{2}$
 $x \neq \frac{1}{2}$

$x-2 \neq 0$
 $x \neq 2$

$$7. \frac{x^2 + 6x + 5}{x^2 - x - 2} = \frac{(x+5)\cancel{(x+1)}}{(x+1)\cancel{(x-2)}} = \boxed{\frac{x+5}{x-2}} \quad \text{rest: } x \neq -1, 2$$

$x+1 \neq 0$
 $x \neq -1$

$x-2 \neq 0$
 $x \neq 2$

$$9. \frac{n^2 + 8n + 16}{16 - n^2} = \frac{(n+4)\cancel{(n+4)}}{(4-n)\cancel{(4+n)}} = \boxed{\frac{n+4}{4-n}} \quad \text{rest: } x \neq \pm 4$$

$4-n \neq 0$
 $+n \quad +n$
 $4 \neq n$

$4+n \neq 0$
 $-4 \quad -4$
 $n \neq -4$

Ⓟ When cancelling we
cancel A numerator factor
with a denominator factor.

$$11. \frac{5y^2 + 10xy}{5y}$$

$$13. \frac{x^2 - 4}{x^4 - 16}$$

$$15. \frac{x^2 + 4x + 3}{x^2 + 2x + 1}$$

$$17. \frac{a^2 - b^2}{a^2 - 6b - ab + 6a}$$

$$\text{*Note } \frac{a-b}{b-a} = -1$$